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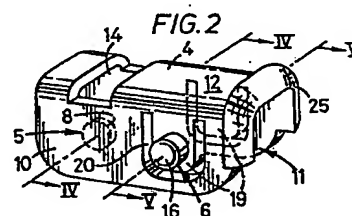
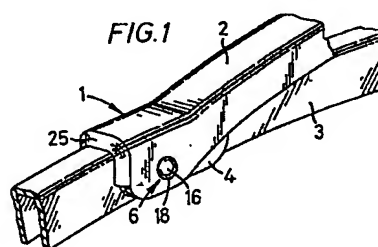
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**(54) Pivot joint.**

(57) A pivot joint (1) for the pivotal connection of two members (2,3) comprises a joint body (4) of substantially channel section having first connection means (5) in opposite side walls (10) of the channel (11) for connection of one of the members (2) to be pivoted which is intended to lie within the channel (11) of the joint body (4) and second connection means (6) in the opposite side walls (10) of the channel (11), spaced longitudinally from the first connection means (5) and for connection of the other of the members (3) to be pivoted which is intended to lie, at least in part, around the outside of the channel (11) of the joint body (4). The side walls (10) of the channel (11) in the region of the first connection means (5) are movable resiliently outwardly of the channel (11) and the side walls (10) of the channel (11) in the region of the second connection means (6) are movable resiliently inwardly of the channel (11). At least one of the first and second connection means (5,6) comprises pivot means.



## Description

PIVOT JOINT

This invention relates to a pivot joint which is particularly but not exclusively useful in the manufacture of windscreen wipers.

In the manufacture of windscreen wipers, a number of pivot joints are used, particularly between the various yokes and/or levers of the windscreen wiper blade.

Problems exist in the manufacture of windscreen wipers due to the necessity, very often, of pivoting metal parts together. These joints tend to be noisy and have a tendency to suffer from wear and corrosion. Various proposals have been made for overcoming these problems, for example, by the provision of plastics members between the metal parts of the joints, but these have not proved to be entirely satisfactory from a manufacturing standpoint although they have worked satisfactorily in use.

The present invention seeks to provide a new and improved pivot joint which is relatively inexpensive to manufacture and use and which overcomes or reduces some or all of the above problems.

According to a first aspect of the invention, a pivot joint comprises a joint body of substantially channel section having first connection means in opposite side walls of the channel for connection of one of the members to be pivoted which is intended to lie within the channel of the joint body and second connection means in the opposite side walls of the channel, spaced longitudinally from the first connection means and for connection of the other of the members to be pivoted which is intended to lie, at least in part, around the outside of the channel of the joint body, the side walls of the channel in the region of the first connection means being movable resiliently inwardly of the channel and the side walls of the channel in the region of the second connection means being movable resiliently outwardly of the channel and at least one of the first and second connection means comprising pivot means.

According to a second aspect of the invention, a pivot joint comprises a first member which is of channel section at least at one end, a second member pivotable to said one end of the first member and adapted to sit within the channel section of the first member with clearance and a joint body of substantially channel section having first connection means in opposite side walls of the channel for connection to the second member which is intended to lie within the channel of the joint body and second connection means in the opposite side walls of the channel, spaced longitudinally from the first connection means and for connection to the first member which is intended to lie, at least in part, around the outside of the channel of the joint body, the side walls of the channel in the region of the first connection means being movable resiliently inwardly of the channel and the side walls of the channel in the region of the second connection means being movable resiliently outwardly of the channel and at least one of the first and second connection means

comprising pivot means.

Preferably, the connection means each comprise a pair of trunnion like projections, the projections of the first connection means projecting into the channel while the projections of the second connection means project outwardly of the joint body, parallel to the projections of the first connection means.

The invention will now be described in greater detail, by way of example, with reference to the drawings, in which:

Figure 1 is a perspective view of one form of pivot joint in accordance with the invention;

Figure 2 is a perspective view of the joint body used in the pivot joint of figure 1;

Figure 3 is a perspective exploded view of the joint shown in figure 1;

Figure 4 is a sectional view of the joint body taken on the line IV-IV of figure 2;

Figure 5 is a sectional view of the joint body taken on the line V-V of figure 2, and

Figure 6 is a view similar to figure 2 but showing a modified joint body.

Referring firstly to figures 1 to 5, there is shown a joint 1 formed between two members 2 and 3, suitably a main and a secondary yoke respectively of a windscreen wiper blade harness. These yokes would normally be made of channel section metal.

The pivot joint 1 comprises a plastics joint body 4 which is generally of channel section having two pairs of longitudinally spaced connection means 5 and 6, the first (5) of which is intended to make pivotal connection with the secondary yoke 3 while the second (6) of which is intended to make connection with the main yoke 2.

The first connection means 5 is in the form of two inwardly directed projections 8 in the form of trunnion members which, when the joint is assembled, cooperate with receiving apertures 9 in the secondary yoke 3. In order to increase the resilience of the sides 10 of the channel 11 of the joint body 4 at this point, the base 12 of the channel 11 is provided with a "cut away" portion 14 which is aligned with the projections 8.

The second connection means 6 is in the form of two outwardly directed projections 16 in the form of trunnion members which, when the joint is assembled, cooperate with receiving apertures 18 on the main yoke 2. In order to provide resiliency for the projections 16, each projection 16 is carried on a tongue 19 which is formed by "cut outs" 20 which surround the projections 16 on three sides. In the embodiment shown, the tongues 19 are attached to the joint body 4 towards the base 12 of the channel 11. In order to allow for flexing of the tongues 19, the secondary yoke 3 is provided with cut away portions 22 as will be described hereafter. The corner of the channel 11 where the base 12 joins the side walls 10 is provided with inclined portions 23 aligned with the tongues 19 which provides locating means cooperating with the cut away portions 22 in the secondary

yoke 3.

In addition to the connection means 5 and 6, the joint body 4 is provided at one end with a partially surrounding upstanding flange 25. This flange 25 is located against the end of the main yoke 2 and acts both as a locating arrangement for the joint body 4 and also protects the otherwise open end of the yoke 2 against the ingress of foreign materials and relieves the projections 8 and 16 from end forces on the windscreen wiper blade.

The assembly of a joint in accordance with the invention will now be described with particular reference to figure 3:

The yokes 2 and 3 are press formed from metal sheet in the usual way. In addition to the usual form of the secondary yoke 3, the yoke 3 is also provided with the cut away portions 22. The joint body 4 is moulded from a suitable plastics material.

The joint body 4 is positioned on the secondary yoke 3 and is aligned therewith such that the tongues 19 are aligned above the cut away portions 22 and the projections 8 are lined up above the usual pivot apertures 9 in the yoke 3. The joint body 4 can then be forced down on the secondary yoke 3. In so doing, the sides 10 of the channel adjacent the projections 8 will be forced resiliently outwards, assisted by the aperture 14 in the channel base 12. Once the two projections 8 have become completely aligned with the apertures 9 in the yoke, the sides 10 of the channel 11 of the joint body 4 will spring back, pushing the projections 8 into the apertures 9. The inclined portions 23 of the channel 11 will locate in the upper part of the cut away portions 22 in the yoke 3.

The joint body 4, together with the secondary yoke 3 can now be offered up to the primary yoke 2. In this case the end of the primary yoke 2 is aligned with the flange 25 of the joint body 4 and the apertures 18 are aligned with the projections 16. As the joint body 4 is pushed up into the main yoke 2, the tongues 19 carrying the projections 16 can be resiliently pushed back into the cut away portions 23 of the secondary yoke 3, enabling insertion of the joint body into the primary yoke until the members 14 are aligned with the apertures and can enter the apertures when the tongues 15 swing back.

It will be appreciated that in the form shown, pivot action will only take place about the pivot means 5, the joint body 4 being constrained against relative movement with respect to primary yoke by the flange 25.

Figure 6 shows an alternative form of joint body 4. In this form of joint body, the tongues 15 carrying the projections 16 are aligned at right angles to those in figure 2 and thus lie longitudinally of the length of the joint body 4.

It will be appreciated that various modifications may be made to the above described embodiments without departing from the scope of the invention. For example, if the flange 25 on the joint body 4 were omitted, a dual pivoting action could take place, the pivotal features of both connection means 5 and 6 being brought into use. Alternatively, arrangements could be made for securing the joint body 4 against rotation relative to the secondary yoke 3 so that only

the pivotal feature of the connection means 6 is used.

If the end of the primary yoke 2 were radlussed about the aperture 18, then the pivotal feature of the connection means 6 could be used without removal of the flange 25, which could, if desired have the same curvature as the yoke end.

It will also be appreciated that while the pivot joint has been described as part of a windscreen wiper blade, the invention can apply to any other suitable type of pivot joint.

## Claims

1. A pivot joint (1) for the pivotal connection of two members (2,3) comprising a joint body (4) of substantially channel section having first connection means (5) in opposite side walls (10) of the channel (11) for connection of one of the members (2) to be pivoted which is intended to lie within the channel (11) of the joint body (4) characterised in that second connection means (6) are provided in the opposite side walls (10) of the channel (11), spaced longitudinally from the first connection means (5) and for connection of the other of the members (3) to be pivoted which is intended to lie, at least in part, around the outside of the channel (11) of the joint body (4), the side walls (10) of the channel (11) in the region of the first connection means (5) being movable resiliently inwardly of the channel (11) and the side walls (10) of the channel (11) in the region of the second connection means (6) being movable resiliently outwardly of the channel (11) and at least one of the first and second connection means (5,6) comprising pivot means.

2. A pivot joint (1) comprising a first member (2) which is of channel section at least at one end, a second member (3) pivotable to said one end of the first member (2) and adapted to sit within the channel section of the first member (2) with clearance and a joint body (4) of substantially channel section having first connection means (5) in opposite side walls (10) of the channel (11) for connection to the second member (3) which is intended to lie within the channel (11) of the joint body (4) characterised in that second connection means (6) is provided in the opposite side walls (10) of the channel (11), spaced longitudinally from the first connection means (5) and for connection to the first member (2) which is intended to lie, at least in part, around the outside of the channel (11) of the joint body (4), the side walls (10) of the channel (11) in the region of the first connection means (5) being movable resiliently inwardly of the channel (11) and the side walls (10) of the channel (11) in the region of the second connection means (6) being movable resiliently outwardly of the channel (11) and at least one of the first and second connection means (5,6) comprising pivot means.

3. A pivot joint as claimed in claim 2, wherein the connection means (5,6) each comprise a pair of trunnion like projections (8,16), the projections (8) of the first connection means (5) projecting into the channel (11) while the projections (16) of the second connection means (6) project outwardly of the joint body (4), parallel to the projections (8) of the first connection means (5).

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4. A pivot joint as claimed in claim 3, wherein the side walls (10) of the channel (11) of the joint body (4) in the region of the first connection means (5) is rendered resilient by removal of the base (12) of the channel (11) of the joint body (4) in a region aligned with the first connection means (5).

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5. A pivot joint as claimed in claim 3 or 4, wherein the the projections (16) of the second connection means (6) are mounted on tongues (19) cut out from the side walls (10) of the channel (11) of the joint body (4).

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6. A pivot joint as claimed in claim 5, wherein the tongues (19) extend at right angles to the base (12) of the channel (11) of the joint body (4).

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7. A pivot joint as claimed in claim 5, wherein the tongues (19) extend parallel to the line of the channel (11) of the joint body (4).

8. A pivot joint as claimed in any one of claims 2 to 8, wherein the members (2,3) are yokes of a windscreen wiper blade.

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9. A pivot joint as claimed in claim 8, wherein the first member (2) is the primary yoke and the second member (3) is the secondary yoke of the windscreen wiper blade.

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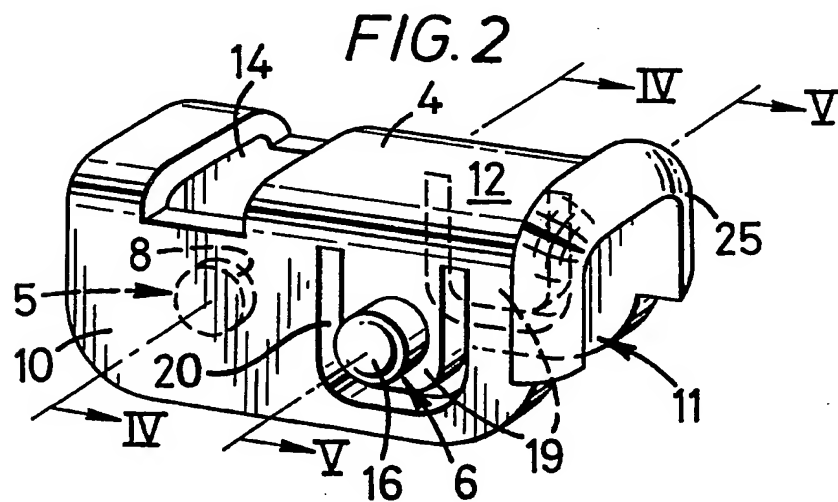
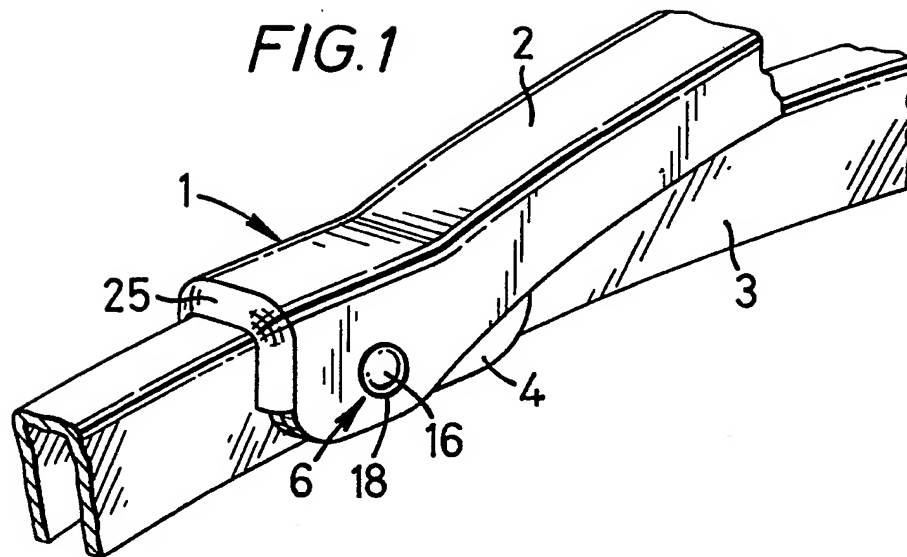
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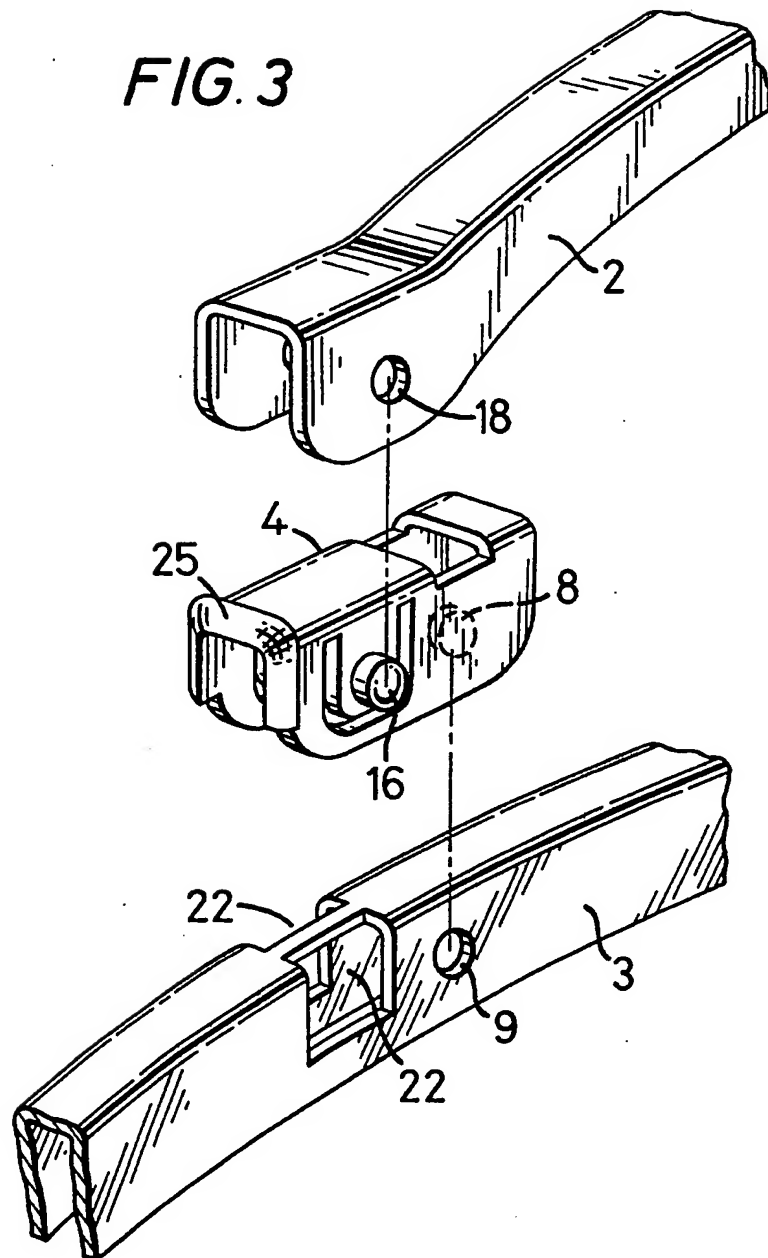
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**FIG. 3**



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FIG. 4

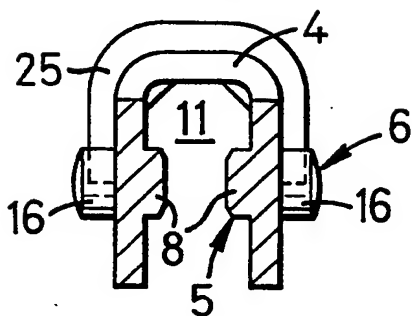


FIG. 5

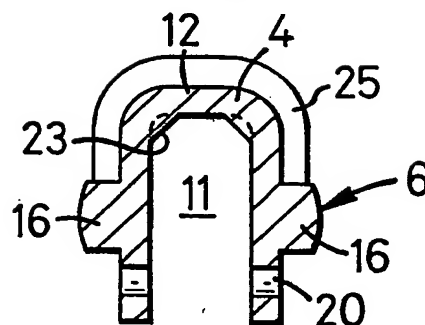
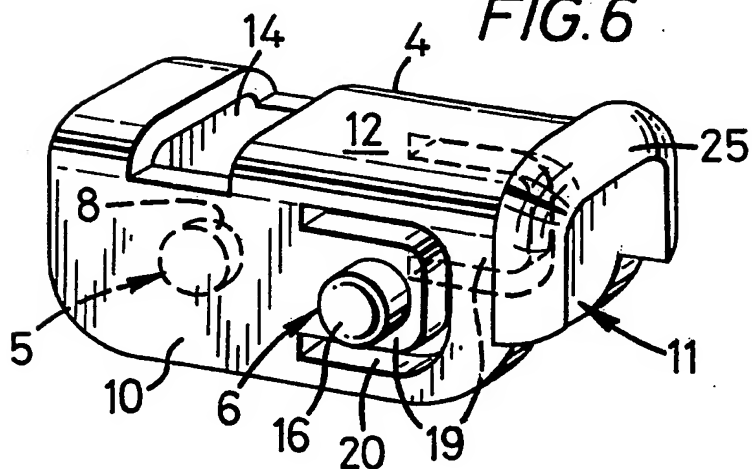


FIG. 6



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